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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/004,010	11/01/2001	Gerald G. Pechanek	800.0046	7418
27997	7590	05/19/2005	EXAMINER	
PRIEST & GOLDSTEIN PLLC 5015 SOUTHPARK DRIVE SUITE 230 DURHAM, NC 27713-7736			DO, CHAT C	
			ART UNIT	PAPER NUMBER
			2193	

DATE MAILED: 05/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/004,010

Applicant(s)

PECHANЕК ET AL.

Examiner

Chat C. Do

Art Unit

2193

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6,9-28 and 37-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6,9-28 and 37-41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

1. This communication is responsive to Amendment filed 01/04/2005.
2. Claims 1-6, 9-28, and 37-41 are pending in this application. Claims 1, 9, 15, 21, 23, and 37 are independent claims. In Amendment, claims 7, 8, and 29-36 are cancelled without prejudice; claims 1, 9, 15, 21, 23, and 37 are amended. This Office action is made final.

#### ***Claim Objections***

3. Claims 21-22 are objected to because of the following informalities:

The applicant is advised to amend or cancel claims 21-22 to avoid claim duplication in the application because the subject matters in claim 21-22 are similar to claims 16-17.

Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 20, the limitation "the second cycle of operation" lacks an antecedence basis. For examination purposes, the examiner disregards this limitation in the claim.

*Claim Rejections - 35 USC § 102*

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-5, 9-19, 21-28, and 37-41 are rejected under 35 U.S.C. 102(e) as being anticipated by Greenberger (U.S. 6,411,979).

Re claim 1, Greenberger discloses in Figures 1b and 2-3 an apparatus for the two cycles computation of a plurality of types of complex multiplication (e.g. col. 2 lines 60-68 and col. 7 lines 20-31), the apparatus comprising: a first storage means (e.g.  $Y1_{real}$  and  $Y1_{imag}$  in Figure 3) for storing a first complex operand and a second complex operand (e.g.  $X1_r:X1_i$  and  $Y1_r:Y1_i$  in respectively in Figure 2), the first complex operand including real component  $X_r$  and imaginary component  $X_i$  (e.g.  $X1_r$  and  $X1_i$  as real and imaginary part in Figure 2), the second complex operand including real component  $Y_r$  and imaginary component  $Y_i$  (e.g.  $Y1_r$  and  $Y1_i$  as real and imaginary part in Figure 2); multiplier means (e.g. 16.11, 16.12, 16.21, and 16.22 in Figure 2 respectively) for simultaneously performing multiplications in a first cycle of operation (e.g. col. 2 lines 60-68) to produce products  $X_r*Y_r$ ,  $X_r*Y_i$ ,  $X_i*Y_r$  and  $X_i*Y_i$ ; a second storage means (e.g. within partial product generator 32) for storing products  $X_r*Y_r$ ,  $X_r*Y_i$ ,  $X_i*Y_r$  and  $X_i*Y_i$ ; adder means (e.g. 34.1 and 34.2 in Figure 2) for simultaneously performing

additions and subtractions in a second cycle of operation (e.g. col. 2 lines 60-68) to produce real result  $(X_r * Y_r) - (X_i * Y_i)$  and imaginary result  $(X_r * Y_i) + (X_i * Y_r)$  if the type of complex multiplication being performed is a non-conjugated operation is being performed (e.g. col. 5 lines 20-31), adder means further for operating to simultaneously perform additions and subtractions of operation to produce real result  $(X_r * Y_r) + (X_i * Y_i)$  and imaginary result  $(X_i * Y_r) - (X_r * Y_i)$  if the type of complex multiplication being performed is a conjugated operation (e.g. col. 6 lines 30-68); a multiplexer coupled (e.g. Figure 1b along with col. 7 lines 1-10) to the multiplier means and the adder means, multiplexer selecting which produced products are added to or subtracted from each other based on the type of complex multiplication being performed (e.g. according to equations 3); and a third storage means for storing the results of adder means (e.g. output of 34.1-34.4 in Figure 3).

Re claim 2, Greenberger further discloses in Figures 1b and 2-3 accumulator means for simultaneously performing accumulation in the cycle of operation to accumulate the results of adder means with the current contents of third storage means, wherein third storage means is further for storing the results of accumulator means (e.g. 34.1-34.4 with summer).

Re claim 3, Greenberger further discloses in Figures 1b and 2-3 extended precision storage means, wherein accumulator means is further for simultaneously performing accumulation in the cycle of operation to accumulate the results of adder means with both the current contents of third storage means and the current contents of

extended precision storage means, wherein extended precision storage means is for storing extended precision results of accumulator means (e.g. col. 7 lines 20-31).

Re claim 4, Greenberger further discloses in Figures 1b and 2-3 the complex operand components  $X_r$ ,  $X_i$ ,  $Y_r$  and  $Y_i$  are each 16 bits, the real and imaginary results are each 32 bits, and the extended precision results are each 8 bits (e.g. col. 7 lines 20-31).

Re claim 5, Greenberger further discloses in Figures 1b and 2-3 the complex operand components  $X_r$ ,  $X_i$ ,  $Y_r$  and  $Y_i$  are each 16 bits, and the real and imaginary results are each 32 bits (e.g. col. 7 lines 20-31).

Re claim 9, it is a method claim of claim 1. Thus, claim 9 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 10, it is a method claim of claim 2. Thus, claim 10 is also rejected under the same rationale as cited in the rejection of rejected claim 2.

Re claim 11, it is a method claim of claim 3. Thus, claim 11 is also rejected under the same rationale as cited in the rejection of rejected claim 3.

Re claim 12, it is a method claim of claim 3. Thus, claim 12 is also rejected under the same rationale as cited in the rejection of rejected claim 3.

Re claim 13, it is a method claim of claim 4. Thus, claim 13 is also rejected under the same rationale as cited in the rejection of rejected claim 4.

Re claim 14, it is a method claim of claim 5. Thus, claim 14 is also rejected under the same rationale as cited in the rejection of rejected claim 5.

Re claim 15, it has the same limitation cited in claim 1, but performed in a cycle. Thus, claim 15 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 16, it has the same limitation cited in claim 2, but performed in a cycle (e.g. wherein this cycle is large enough to for processing those two cycles above). Thus, claim 16 is also rejected under the same rationale as cited in the rejection of rejected claim 2.

Re claim 17, it has the same limitation cited in claim 3, but performed in a cycle (e.g. wherein this cycle is large enough to for processing those two cycles above). Thus, claim 17 is also rejected under the same rationale as cited in the rejection of rejected claim 3.

Re claim 18, it has the same limitation cited in claim 4, but performed in a cycle (e.g. wherein this cycle is large enough to for processing those two cycles above). Thus, claim 18 is also rejected under the same rationale as cited in the rejection of rejected claim 4.

Re claim 19, it has the same limitation cited in claim 5, but performed in a cycle (e.g. wherein this cycle is large enough to for processing those two cycles above). Thus, claim 19 is also rejected under the same rationale as cited in the rejection of rejected claim 5.

Re claim 21, it has limitations cited in claim 16. Thus, claim 21 is also rejected under the same rationale as cited in the rejection of rejected claim 16.

Re claim 22, it has limitations cited in claim 17. Thus, claim 22 is also rejected under the same rationale as cited in the rejection of rejected claim 17.

Re claim 23, it is a method claim of claim 15. Thus, claim 23 is also rejected under the same rationale as cited in the rejection of rejected claim 15.

Re claim 24, it is a method claim of claim 16. Thus, claim 24 is also rejected under the same rationale as cited in the rejection of rejected claim 16.

Re claim 25, it is a method claim of claim 17. Thus, claim 25 is also rejected under the same rationale as cited in the rejection of rejected claim 17.

Re claim 26, it is a method claim of claim 17. Thus, claim 26 is also rejected under the same rationale as cited in the rejection of rejected claim 17.

Re claim 27, it is a method claim of claim 18. Thus, claim 27 is also rejected under the same rationale as cited in the rejection of rejected claim 18.

Re claim 28, it is a method claim of claim 19. Thus, claim 28 is also rejected under the same rationale as cited in the rejection of rejected claim 19.

Re claim 37, it has limitations cited in claim 1. Thus, claim 37 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 38, it has limitations cited in claim 2. Thus, claim 38 is also rejected under the same rationale as cited in the rejection of rejected claim 2.

Re claim 39, it has limitations cited in claim 3. Thus, claim 39 is also rejected under the same rationale as cited in the rejection of rejected claim 3.

Re claim 40, it has limitations cited in claim 4. Thus, claim 40 is also rejected under the same rationale as cited in the rejection of rejected claim 4.



Re claim 41, it has limitations cited in claim 5. Thus, claim 41 is also rejected under the same rationale as cited in the rejection of rejected claim 5.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 6 and 20 are rejected under 35 U.S.C. 103(a) as being obvious over Greenberger (U.S. 6,411,979) in view of Greenberger (U.S. 6,675,187).

Re claim 6, Greenberger (U.S. 6,411,979) does not disclose in Figures 1b and 2-3 the multiplier means is further for simultaneously performing multiplications in the second cycle of operation utilizing a second pair of operands. However, Greenberger (U.S. 6,675,187) discloses in Figure 7 the multiplier means is further for simultaneously performing multiplications in the second cycle of operation utilizing a second pair of operands as pipeline processing (e.g. abstract). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to utilize the multiplier in pipeline manner for simultaneously performing multiplications in the second cycle of operation utilizing a second pair of operands as seen in Figure 7 of Greenberger (U.S. 6,675,187) because it would enable to increase the throughput of system by processing data in pipeline manner.

Re claim 20, it has the same limitation cited in claim 6, but performed in a cycle (e.g. wherein this cycle is large enough to for processing those two cycles above). Thus, claim 20 is also rejected under the same rationale as cited in the rejection of rejected claim 6.

### ***Response to Arguments***

10. Applicant's arguments with respect to claims 1-6, 9-28, and 37-41 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

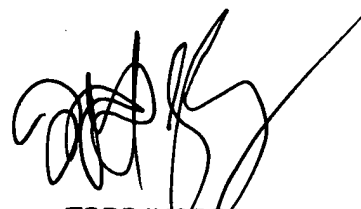
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (571) 272-3721. The examiner can normally be reached on 7:00AM to 5:00PM M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaki Kakali can be reached on (571) 272-3719. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C Do  
Examiner  
Art Unit 2193

May 4, 2005



**TODD INGBERG**  
**PRIMARY EXAMINER**